TEGRA LINUX DRIVER PACKAGE

31.1 Release Notes

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1.0 About this Release

The NVIDIA® Tegra® Linux Driver Package 31.1 release supports development on the NVIDIA® Jetson AGX Xavier™ Developer Kit.

Note:	This release is intended for use with NVIDIA Jetson AGX Xavier only. NVIDIA does not provide support for this release on other products.

Platform and Release Information

Description	Supported Version
Host machine version for flashing software onto Jetson devices.	Ubuntu x64 16.04 or 18.04 (x64 distribution)
Sample rootfs derived from Ubuntu operating system to run on Jetson devices.	Ubuntu 18.04 (arm64 distribution)
Supported Linux kernel version.	4.9
Supported ARM architecture.	aarch64
The board/module name, used in flashing and paths in the software.	jetson-xavier
The board/module and revision number.	Jetson AGX Xavier: P2972-0000
The release tag name. Consult the kernel source to identify the tag name at: http://nv-tegra.nvidia.com/gitweb/?p=linux-4.9.git Kernel source are live across several repositories. Consult the topic Kernel Customization > Obtaining the Kernel Sources with Git in the *Development Guide* for details.	tegra-l4t-r31.1

Platform Support with Quality Target

The platform supported, at the targeted quality level, is as follows.

Platform	Quality Target
NVIDIA Tegra® Linux Driver Package	Developer Preview

1.1   Login Credentials

The default login credentials are:

▶ Username: `nvidia`
▶ Password: `nvidia`

Note:	For security purposes and for best practices, NVIDIA recommends changing the default password.

2.0 Known Issues

This section provides details about issues discovered during development and QA but not resolved in this release.

2.1 General System Usability

The following general system usability related issues are noted in this release.

Issue	Description
2419317	Performance drop due to EMC frequency not set correctly for CPU workload. (See <u>EMC the Implementation Note Frequency Adjustment for CPU Workload</u>.)
200461808	When connecting the Intel IGB PCIE card, CPU errors may occur during system idle.
200436049	Failure to launch NVVP after installing `cuda-repo-ubuntu1804-10-0-local-10.0.96-410.27_1.0-1_amd64.deb`.
200464272	System may fail to enter SC7 state when certain PCIe Network Interface Cards are connected. (Issue was seen with two different NICs, neither of which uses the igb driver). This issue is under investigation.

2.2 Camera

The following camera related issues are noted in this release.

Issue	Description
2032213	The maximum value that `getExposureTimeRange()` may return is 400000000.000 (400,000,000 nanoseconds, 400 msec).
200297610	Preview freeze with WDR mode when AWB lock is set and user attempts to change AWB mode to Auto.

200455493	Defog feature of `argus_camera` app is not supported in this release. The following options of `argus_camera` app do not work:
	
	    `--defog=ENABLE`
	    `--defogamount=AMOUNT`
	    `--defogquality=QUALITY`

200455200	`argus_userautoexposure` app failed to run the sample in DOL WDR modes.
200455287	`argus_userautowhitebalance` app gives greenish preview on high exposure scenes.
200459897	Blur and corruption observed with SLVS-EC sensor.
200443798	VisionWorks `nvx_sample_nvgstcamera_capture` sample application fails to run.

2.3 CUDA Samples

The following CUDA samples related issues are noted in this release.

Issue	Description
200448615	Argus CUDA samples crash or hang for CPHY sensor IMX318, possibly due to very high resolution of the sensor. If the resolution is set to less than 4K in EGL stream settings, the sample passes successfully.

2.4 Multimedia

The following multimedia related issues are noted in this release.

Issue	Description
200387512	gstreamer based video playback using Wayland not working when Weston is started as an NVIDIA user.

3.0 Top Fixed Issues

These issues are resolved in this release.

3.1 General System Usability

General system usability related resolved issues are as follows:

Issue Number	Description
200437318	Tegrastats does not save information to a file.
200454955	Kernel PWM fan driver overrides fan setting applied by jetson_clocks.sh.

3.2 Camera

Camera related resolved issues are as follows:

Issue Number	Description
200422466	IMX185 sensor not supported in this release.

4.0 Documentation Corrections

This section describes errors in documentation that were discovered too late to be corrected.

4.1   Adaptation and Bring-Up Guide

These corrections apply to the *Jetson AGX Xavier Platform Adaptation and Bring-Up Guide*.

4.1.1   PCIe Controller Configuration

In the command line example, replace this command:

```
kernel/nvidia/Documentation/devicetree/bindings/pci/nvidia,tegra19x-
pcie.txt
```

With this:

```
$(KERNEL_TOP)/Documentation/devicetree/bindings/pci/nvidia,tegra19x-
pcie.txt
```

4.2   EEPROM Layout Information

EEPROM layout information was omitted from the Development Guide for this release. It is available as a separate document titled *Jetson Module EEPROM Layout* from the Jetson Download Center at:

```
https://developer.nvidia.com/embedded/downloads
```

5.0 Implementation Details

5.1 Video Decoder Instance Selection Planned Deprecation

To ensure portability of code across product generations, the interfaces for specification of the NVIDIA Video Decoder instance are planned for deprecation.

In a future release, the Video Decoder interface is planned to be replaced with support for workload scaling across available decoder instances.

The interfaces planned for deprecation include:

▶ V4L2 external control ID `V4L2_CID_MPEG_VIDEO_DECODE_INSTANCE`
▶ GStreamer decoder property `dec-instanceId`

5.2 Symlinks May be Overwritten by Installation of Third Party Libraries

Installing third party libraries on the target device may overwrite the accelerated library provided by Linux for Tegra.

For example, installing Mesa EGL may create a `/usr/lib/<arch>/libEGL.so` symlink, overwriting the symlink to the implementation library that should be used instead, `/usr/lib/<arch>/tegra-egl/libEGL.so`.

Linux for Tegra installs a boot-time initialization script `/etc/init/nv.conf`, that corrects typical occurrences, such as with OpenGL, EGL, and X11 GLX libraries. This script runs at boot and corrects typical occurrences.

To workaround

▶ Reboot after installation of packages that install conflicting library symlinks.

5.3   New Users Must be Added to Video Group

When adding users to the system you must add them to the `video` group for the Linux desktop to appear and function correctly.

5.4   Type-C Devices Unable to Drive DisplayPort

This is Known Issue 2183567.

For DP, Bootloader display polls for at most 1 msec. by default when trying to detect whether HPD has been asserted by the sink. Different Type-C downstream devices connected to the Type-C ports on Jetson AGX Xavier (cables, adapters, hubs, etc) may incur different amounts of latency before they trigger the handshake process needed to drive DP over Type-C.

Workaround: If a seamless display does not come up with the Type-C device you are using, try increasing the HPD_TIMEOUT_MS value in `tegrabl_display_dtb.c`. We recommend increasing the timeout value in 500 msec. increments. Increasing the timeout value guarantees interoperability with a larger variety of devices, but also increases the boot time.

5.5   Instability after GDM Restart

After GDM restart, multiple issues may appear like desktop not coming back (device entering infinite loop of tegradc blank/unblank) or unable to log in.

Workaround: Add this line to `/lib/systemd/system/gdm.service`:

```
ExecStopPost=/bin/loginctl terminate-seat seat0
```

5.6   DLA Cores Do Not Support INT8

The DLA can accelerate Deep Learning inference workloads with INT8 and FP16. In this developer preview release, only FP16 is supported. INT8 will be supported in a later release.

5.7 OpenGL-ES 1.1 Support Not Available

OpenGLES 1.1 support is not present in this release because Canonical did not provide the `libGLESv1_CM.so` library as part of GLVND libraries in Ubuntu 18.04. Any app that is linked with this library cannot run.

Canonical is working on the issue via bug https://bugs.launchpad.net/ubuntu/+source/libglvnd/+bug/1780039.

After the bug is fixed, an updated GLVND package will be available for Ubuntu 18.04 (Bionic). After the update is applied, `libGLESv1_CM.so` will be available and OpenGLES 1.1 support will work as expected without requiring any changes to the BSP.

5.8 Khronos Conformance Status

This release supports the following Khronos APIs:

- ▶ OpenGL-ES 3.2
- ▶ OpenGL 4.6
- ▶ Vulkan 1.1

The product is based on a published Khronos specification. It has been submitted to, and is expected to pass, the Khronos Conformance Process. Current conformance status can be found at http://www.khronos.org/conformance.

The CTS test version used to run conformance for each of the APIs is:

- ▶ OpenGL-ES: 3.2.5.0
- ▶ OpenGL: 4.6.0.0
- ▶ Vulkan: 1.1.1.2

5.9 Visual Profiler Launch Failure Workaround

This is Known Issue 200436049.

To run Visual Profiler on Ubuntu 18.04:

Install the package `openjdk-8-jre`, and

Invoke Visual Profiler with the `-vm` command line option included:

```
nvvp -vm /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/java
```

The –vm option is only required if JRE is not included in CUDA Toolkit package and JRE 1.8 is not in the default path.

5.10 EMC Frequency Adjustment for CPU Workload

This note addresses the potential performance drop identified in Known Issue 2419317.

The EMC frequency for CPU workload is decided by the static CPU-EMC mapping table and the mc_all activity monitor (actmon) driver. The CPU-EMC mapping table decides base minimum EMC frequency based on CPU frequency. The mc_all actmon is responsible for scaling EMC frequency from the base minimum to a higher value proportional to memory bandwidth utilization.

In this release the CPU-EMC mapping table is tuned, that is, the EMC base frequency mapped to CPU frequency has been reduced to optimize power consumption. The tuned CPU-EMC table does not affect performance of the GPU, NVDEC, and NVENC workloads, as each has its own EMC scaling algorithm, but it may affect CPU workload performance, especially when CPU load is high and bandwidth utilization is low. If any such performance drop is observed, the CPU-EMC mapping table can be tuned in this location, based on performance/power requirements:

```
<source>/hardware/nvidia/soc/t19x/kernel-dts/tegra194-soc/tegra194-soc-
base.dtsi
```

5.11 GPU Debug and Profiling Tools Must Be Run as Root

By default GPU debug and profiling tools now require running as root, or launching with the sudo command, to function correctly.

The system administrator can grant privileges to general users if preferred.

5.12 Beta Level Support for HBR3

This release provides beta level support for HBR3 with DisplayPort version 1.4a.

6.0 About Earlier Releases

15 October 2018 — 31.0.2

Known Issues

General System Usability

The following general system usability related issues are noted in this release.

Issue	Description
2183567	Type-C devices unable to drive DP due to length of delay before handshake begins. *Workaround*: see Type-C Devices Unable to Drive DisplayPort.
200441525	An application to be debugged NVIDIA Developer Tools (CUDA tools, NVIDIA Nsight Systems/Graphics) must be run as the root user, or with root permissions.
2218290	Thermal shutdown reboots system instead of powering off.
200436049	nvvp (Visual Profiler) launch fails after installing `cuda-repo-ubuntu1804-10-0-local-10.0.96-410.27_1.0-1_amd64.deb`.
200442461	VisionWorks SFM sample fails to run; shows black image when launching `nvx_sample_sfm` sample.
200447045	SC7 system suspend/resume may have intermittent resume failures in this release.

Boot

The following boot related issues are noted in this release.

Issue	Description
2305640	CBoot bootloader cannot access USB mass storage devices connected via a USB hub.

Camera

The following camera related issues are noted in this release.

Issue	Description
2258817	Incorrect ISP settings may be applied if camera module is replaced with a module that does not support a unique identifier (fuse ID). (Workaround: manually remove the cached `.bin` files in `/var/nvidia/nvcam/settings`.)
200422466	IMX185 sensor not supported in this release.
200445964	Greenish image capture with `argus_onshot`.
2199266	Temporal noise reduction may cause a slight green tint to images.
200407738	Greenish tint on displayed preview image when running the sample software `argus_userautowhitebalance`.

CUDA

The following CUDA related issues are noted in this release.

Issue	Description
200431121	If a CUDA application calls `malloc()` within a CUDA kernel (device-side `malloc`) while running concurrently with another CUDA or GPU-accelerated graphics application, the application may fail.

Display

The following display related issues are noted in this release.

Issue	Description
2284878	Cannot operate GeChic 1101 display connected through USB-C to USB-A when aut-search mode is enabled.
200404683	Display Port (DP) monitors do not show a bootloader splash screen at boot, and may require a hotplug after boot to display content properly.
200434425	Display driver may produce "Failed to write DPCD data" errors after a display hotplug with certain monitors including Dell U2413 and Dell U2713.

JetPack Installer

The following JetPack Installer related issues are noted in this release.

Issue	Description
2340186	After installation of CUDA 10.0 host packages, the apt package management system may produce "Failed to fetch" messages due to the addition of the arm64 architecture to the apt package repository configuration.

Kernel

The following kernel related issues are noted in this release.

Issue	Description
200443630	Hotplugging a UFS card may cause the Linux kernel to report a CPU SError.
200399574	Using USB devices that are not fully compatible with the USB Gen2 specification may cause kernel error messages like "tegra-xusb 3610000.xhci: Cannot set link state."
2211831	UART serial console using USB to TTL serial cable does not work.